

What is claimed is:

1. A method for fabricating a shallow trench isolation, comprising the steps of:

5 sequentially depositing a silicon oxide layer, a silicon nitride layer and a moat pattern on a silicon substrate;

10 etching the silicon nitride layer and the silicon oxide layer using the moat pattern as a mask to thereby partially expose the silicon substrate and then removing 15 the moat pattern;

15 performing ion implanting process into the silicon substrate using the silicon nitride layer as a mask, adjusting a dose of an implanted ion and an implant energy, to thereby form an isolation region;

anodizing the isolation region to form a porous silicon and to form an air gap in the porous silicon, wherein a porosity of the porous silicon is determined by the dose of the implanted ion;

20 oxidizing the porous silicon through an oxidation process; and

removing the silicon nitride layer.

25 2. The method of claim 1, wherein the etching step includes the steps of etching the silicon nitride layer with a slope or inserting an additional sidewall nitride

layer process into the STI process to form a space smaller than the moat pattern.

3. The method of claim 1, wherein the ion implanting process is iteratively performed using different ion implant conditions to thereby form the isolation region having a stepwise ion concentration.

4. The method of claim 1, wherein the ion implanting process is performed with N-type material.

5. The method of claim 1, wherein the ion implanting process is performed with P-type material.

15 6. The method of claim 1, wherein a porosity and a thickness of the porous silicon is controlled by adjusting a reaction time in anodic oxidation.

7. The method of claim 1, wherein a porosity and a thickness of the porous silicon is controlled by adjusting a current density in anodic oxidation.

20 8. The method of claim 1, wherein a porosity and a thickness of the porous silicon is controlled by adjusting 25 hydrofluoric (HF) concentration in anodic oxidation.